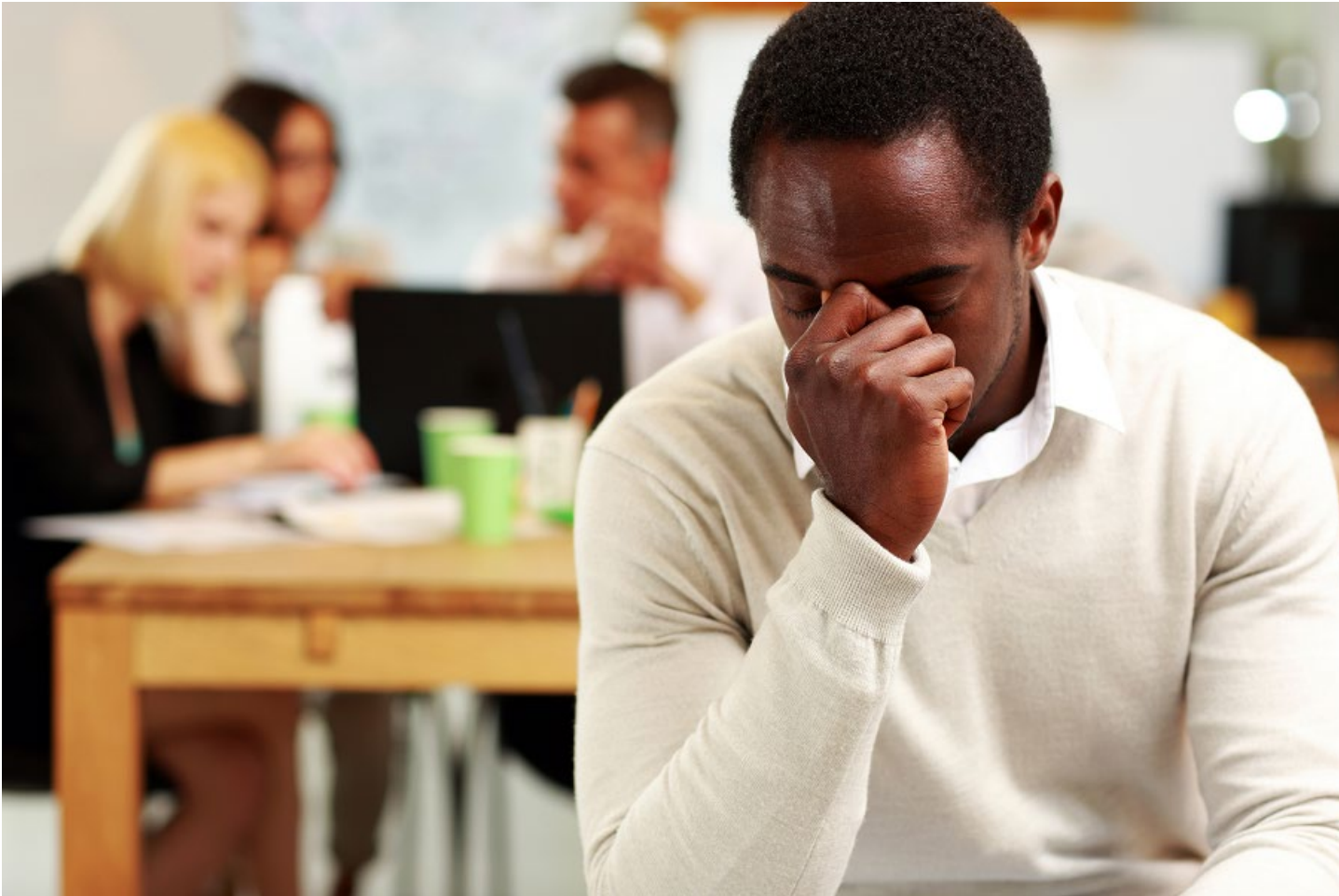Erasmus
School of
Economics

Reducing free-riding in group projects in line with students' preferences:

Does it matter if there is more at stake?

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Academic
Skills

Introduction: Group work and free-riding

Question: Do you have experienced free-riding yourself?

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Introduction

- **Challenge: How to reduce free-riding?**
  - many factors
  - "easy-to-implement set-up factors" (p. 255) (Aggarwal & O'Brien, 2008)
  - student preferences (van den Herik and Benning, 2021)

- **Study aim**
  - measure students' preferences
  - investigate how preferences are affected by <u>stake</u>

Theoretical framework: High stakes

- **Vested interest (VI) theory** (Crano & Prislin, 1995; Sivacek & Crano, 1982)

- **High stakes → "not in my backyard" mindset** (Thornton & Knox, 2002)

- **Hypothesis:**
  Group project characteristics which are more effective in reducing free-riding become more important for students when their personal stakes increase.

Method: Discrete choice experiment

- **Discrete choice experiment (DCE)** (Louviere et al., 2000; Hensher et al., 2005)

- **Attribute and attribute level selection**

Table 2. Example choice task.

Suppose that the group project (of a newly designed course) counts for **10%** of the final course grade. Which group project would you prefer?

	Group project A	Group project B
Team size	2 students	3 students
Team formation approach	assignment based on schedule availability and motivation	assignment based on schedule availability and motivation
Number of peer process evaluations	1 peer process evaluation	2 peer process evaluations
Type of grade	divided grade	divided grade
Method to handle free-riding	two-card system	member expulsion
I would prefer:	☐	☐

Table 1. Attributes and attribute levels of the DCE and their expected effect on free-riding.

Attribute	Attribute levels	Expected effect on free-riding	Relevant literature
Team size	2 students 3 students 4 students	A small(er) team size is expected to lead to less free-riding	(Aggarwal and O'Brien, 2008; Strong and Anderson, 1990)
Team formation approach	Self-selection Random assignment Assignment based on schedule availability and motivation	Self-selection and assignment based on schedule availability and motivation are expected to lead to less free-riding than random assignment	(Bacon et al., 2001; Chapman et al., 2006; Harding, 2018; Kutlubay and Uslay, 2019; Strong and Anderson, 1990)
Number of peer process evaluations	0 peer process evaluations 1 peer process evaluation 2 peer process evaluations	The use of (multiple) peer evaluations is expected to lead to less free-riding	(Aggarwal and O'Brien, 2008; Brooks and Ammons, 2003; van den Herik and Benning, 2021)
Type of grade	Common grade Divided grade	A divided grade is expected to lead to less free-riding than a common grade	(Lejk and Wyvill, 2001; Maiden and Perry, 2011)
Method to handle free-riding	Conversation with the coordinator Member expulsion Two-card system	The two-card system and member expulsion are expected to lead to less free-riding than a conversation with the coordinator	(Abernethy and Lett, 2005; Maiden and Perry, 2011; van den Herik and Benning, 2021)

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Question: Do you have suggestions for other attributes and/or attribute levels?

Method: Experimental design

- 3 blocks
- 12 choice tasks per respondent (4 grade weights)
- grade weights: 10%, 30% or 100%

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Type of grade	divided grade	divided grade
Method to handle free-riding	two-card system	member expulsion
I would prefer:	☐	☐

Method: Questionnaire and data collection

- **Survey set-up**
  - general questions
  - explanation characteristics
  - 'warming-up' exercise
  - scenario
  - 1 example choice task + 12 main choice tasks
  - other questions
  - lottery (10 prizes of 50 euro)

- **Data collection**
  - mid-June to mid-July 2021
  - access via a link on Canvas
  - courses: "Academic Skills" and "Research project"

Method: Econometric model (1)

- Two RPL models:
  - Nlogit 6.0
  - Normal distributions for random parameters

- Utility function (extended model):

$$U_{njt} = \alpha + \left(\beta_1 + v_{1n}\right) * Teamsize2_j + \left(\beta_2 + v_{2n}\right) * Teamsize3_j$$
$$+ \left(\beta_3 + v_{3n}\right) * Self-selection_j + \left(\beta_4 + v_{4n}\right) * Availability\, motivation_j$$
$$+ \left(\beta_5 + v_{5n}\right) * Peerevaluation1_j + \left(\beta_6 + v_{6n}\right) * Peerevaluation2_j$$
$$+ \left(\beta_7 + v_{7n}\right) * Divided\, grade_j + \left(\beta_8 + v_{8n}\right) * Member\, expulsion_j + \left(\beta_9 + v_{9n}\right)$$
$$* Two-card\, system_j + \left(\beta_{10}\right) * Weight100\%\, x\, Teamsize2_j + \left(\beta_{11}\right)$$
$$* Weight100\%\, x\, Teamsize3_j + \left(\beta_{12}\right) * Weight100\%\, x\, Self-selection_j + \left(\beta_{13}\right)$$
$$* Weight100\%\, x\, Availability\, motivation_j + \left(\beta_{14}\right) * Weight100\%\, x\, Peerevaluation1_j$$
$$+ \left(\beta_{15}\right) * Weight100\%\, x\, Peerevaluation2_j + \left(\beta_{16}\right) * Weight100\%\, x\, Divided\, grade_j$$
$$+ \left(\beta_{17}\right) * Weight100\%\, x\, Member\, expulsion_j + \left(\beta_{18}\right) * Weight100\%\, x\, Two-card\, system_j + \varepsilon_{njt}$$

Results: Table 3

Table 3. Descriptive statistics of the sample.

Characteristics	n	%	M (SD)
Gender			
Male	147	57.2	-
Female	108	42.0	-
Other	2	0.8	-
Age (in years)	-	-	19.4 (1.26)
Which course(s) do you currently follow?			
Academic Skills (Dutch) in bachelor one (block 5)	127	49.4	-
Academic Skills (English) in bachelor one (block 5)	83	32.3	-
Academic Skills (English) in bachelor two (double degree) (block 5)	15	5.8	-
Research project (Dutch) in bachelor two (block 5)	18	7.0	-
Research project (English) in bachelor two (block 5)	14	5.4	-
None of the above courses	1	0.4	-
Interested in a team training?			
No	165	64.2	-
Yes	92	35.8	-
Have you worked in a team with a free-rider this academic year?			
No	171	66.5	-
Yes, in block 1	1	0.4	-
Yes, in block 2	6	2.3	-
Yes, in block 3	25	9.7	-
Yes, in block 4	33	12.8	-
Yes, in block 5	47	18.3	-
Attitude toward teamwork:			
The ability to solve problems within a team is more important than as an individual.	-	-	3.60 (0.84)
I prefer to be graded as a team member rather than individually.	-	-	3.07 (1.07)
Teamwork enhances my learning.	-	-	3.54 (1.07)
Individualism/collectivism:			
Group welfare is more important than individual rewards.	-	-	3.16 (1.00)
Individuals should pursue their goals only after considering the welfare of the group.	-	-	3.26 (0.93)
I focus on achieving societal goals more than individual accomplishments.	-	-	2.87 (1.01)
Group rewards should take priority over individual rewards.	-	-	3.07 (1.03)

n = number of respondents; M = mean; SD = standard deviation.

- 357 started
- 262 fully completed
- 5 removed (< 3 minutes)
- 39 different countries
- most Dutch (65.4%)

Results: Table 4

Table 4. Random parameter logit model results for group project choice.

Variables	Model 1 (base)				Model 2 (two-way interactions)			
	Coefficients (b)		Heterogeneity components (v)		Coefficients (b)		Heterogeneity components (v)	
Constant	0.02	(0.06)	-	-	0.02	(0.07)	-	-
Teamsize2	0.43***	(0.14)	1.45***	(0.18)	0.60***	(0.17)	1.49***	(0.18)
Teamsize3	0.46***	(0.12)	0.12	(0.37)	0.44***	(0.15)	0.10	(0.37)
Teamsize4 (base)	-	-	-	-	-	-	-	-
Self-selection	0.81***	(0.16)	1.98***	(0.18)	0.65***	(0.17)	2.03***	(0.19)
Availability motivation	0.87***	(0.13)	1.15***	(0.16)	0.76***	(0.15)	1.17***	(0.16)
Random assignment (base)	-	-	-	-	-	-	-	-
Peerevaluation1	0.62***	(0.10)	0.11	(0.21)	0.54***	(0.12)	0.10	(0.23)
Peerevaluation2	0.56***	(0.12)	0.89***	(0.15)	0.47***	(0.14)	0.87***	(0.16)
Peerevaluation0 (base)	-	-	-	-	-	-	-	-
Divided grade	−0.42***	(0.11)	1.14***	(0.13)	−0.51***	(0.12)	1.16***	(0.13)
Common grade (base)	-	-	-	-	-	-	-	-
Member expulsion	−0.30***	(0.11)	0.81***	(0.15)	−0.26*	(0.13)	0.85***	(0.16)
Two-card system	−0.12	(0.11)	0.70***	(0.18)	−0.11	(0.14)	0.74***	(0.18)
Conversation coordinator (base)	-	-	-	-	-	-	-	-
Weight100% × Teamsize2					−0.49**	(0.25)		
Weight100% × Teamsize3					0.06	(0.28)		
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Observations	257				257			
LL	−1859.12				−1848.86			
DF	19				28			
R²	0.13				0.14			
AIC	3756.2				3753.7			

Standard errors are between parentheses.
LL: log likelihood; DF: degrees of freedom; AIC: Akaike information criterion.
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So:
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If GP counts for 100%:
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If GP counts for 100%:
- team size of 2 less important for students
- team formation approach (self-selection) more important for students

Discussion: Findings and related literature (1)

- **Students' preferences → match literature**
  - ○ small team size (Aggarwal & O'Brien, 2008; Strong & Anderson, 1990)
  - ○ no random assignment (Chapman et al., 2006)
  - ○ peer evaluations (Aggarwal & O'Brien, 2008; Brooks & Ammons, 2003)

- **Hypothesis → (partly) supported**
  "Group project characteristics which are more effective in reducing free-riding become more important for students when their personal stakes increase."

Limitations

- **Low response rate** → representative sample (but 57.2% vs. 68.2% males)

- **Perception of stake?**

- **Other characteristics/levels:**
  - combination of common and divided grade
  - team formation approaches

- **Stated preferences ≠ revealed preferences** (Hensher et al., 1998)

Implications for educators: Recommendations

- **How to reduce FR:**
  - no random assignment
  - 1 or 2 peer process evaluations (not 0)
  - team size of 2 or 3 students (not 4)

- **High stakes:**
  - self-selection even more important
  - team size of 3 students

- **And satisfy students (not to reduce FR):**
  - type of grade → common grade (instead of divided graded)
  - handle FR → conversation coordinator (not member expulsion)

Implications for educators: Some caution!

- **Relevant for departments → BP recommendations** (McCorkle et al., 1999)

- **Be cautious!**
  - students' preferences may vary (van den Herik & Benning, 2021)

- **Measure preferences and publish results ➔**
  - more insights on how to reduce FR
  - while keeping students satisfied!

Questions?

Thank you for your attention!